Synopsis of Dental Amalgam Alloys (Project 05-29) (6/06)

This synopsis provides information obtained from the manufacturers on several commonly used dental amalgam alloys. Click here for tables. The alloys are listed alphabetically by company.

Although amalgam use by civilian practitioners is declining, it is still used in the majority of dental practices[1] and continues to remain the most widely used direct posterior restorative material by US federal service dentists. Important considerations in the selection of an amalgam alloy are the type of amalgam and its physical properties, handling characteristics, and clinical performance over time. Strength is probably the least important characteristic because all brands marketed today are strong enough to resist the normal forces encountered in the oral cavity and easily exceed the minimum requirement by ADA specifications. The level of creep was formerly used as a predictor of the degree to which an amalgam would undergo marginal "ditching" or breakdown, however, with the advent of the high-copper amalgams, it is no longer a good discriminator. Probably the most useful characteristic to consider when selecting an alloy is the way it handles during condensation and carving. Knowing the type or composition of amalgam can be very helpful in giving you information about how it handles clinically. Based on the shape of the alloy particles, the four types of amalgam are: single-composition lathe cut (SCL), single-composition spherical (SCS), admixture of lathe-cut with spherical silver-copper eutectic particles (ALE), and admixture of lathe-cut with single-composition-spherical particles (ALSCS). The spherical amalgams are easy to condense into smaller areas (e.g., around pins, grooves, potholes) because they provide less resistance to condensation, harden rapidly, and are smoother for carving and polishing, however, they have more difficulty establishing a solid proximal contact. Admixed amalgams can be used effectively to establish acceptable proximal contacts, however, they may harden more slowly. For a text briefing and a slide presentation on amalgam, please visit the Continuing Education section of the DECS Web site.

DECS often receives questions concerning problems with the trituration of amalgam. It is important to mix amalgam for the appropriate amount of time and speed because it can affect the alloy's working time, handling characteristics and clinical performance. Links to the manufacturer's suggested trituration times, if available, are provided in the tables. For clinical tips on determining mixing time, click here.

When reviewing the tables, please keep in mind that the information has been provided by the manufacturers, and not necessarily confirmed by DECS evaluation. The alloys presented are some of the more commonly used in federal dental clinics, therefore, some companies and/or amalgam alloys may not appear in the table.

References:

1. Dental Products Report Exclusive 2005 Materials Survey to General Dentists. Dental Products Reports 2005.

Synopsis of Dental Amalgam Alloys* (6/06)

Product	**Dispersalloy** 	**Megalloy EZ** 	**Unison** 
Manufacturer	Dentsply Caulk 38 West Clark Ave P.O. Box 359 Milford, DE 19963 (800) 532-2855 (302) 422-4511 (800) 788-4110 FAX www.dentsply.com	Dentsply Caulk 38 West Clark Ave P.O. Box 359 Milford, DE 19963 (800) 532-2855 (302) 422-4511 (800) 788-4110 FAX www.dentsply.com	Dentsply Caulk 38 West Clark Ave P.O. Box 359 Milford, DE 19963 (800) 532-2855 (302) 422-4511 (800) 788-4110 FAX www.dentsply.com
Particle Type	Admixture	Spherical	Spherical
Composition (%)	Silver 69.3, Tin 17.9, Copper 11.8, Zinc 1, Mercury:alloy ratio 50:50	Silver 58, Tin 28, Copper 14, Mercury:alloy ratio 43:57	Silver 56.7, Tin 28.6, Copper 14.7, Mercury:alloy ratio 42:58
Compressive Strength (PSI) 1 hr 24 hr	Regular Set 17,900 60,400 | Fast Set 19,400 58,200	35,000 86,000	33,000 72,400
Packaging	Self-activating capsules 1, 2, 3 spill in both regular and fast set	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill
$/Capsule (2-sp, Reg Set) Retail: Government:	1.66 1.00	1.65 1.00	1.52 0.92
Working Time (mins)	Reg Set - 3:30; Fast Set- 2:30	2:30	3:00
Setting Time (mins)	Reg Set - 8:00; Fast Set: 5:30	5:30	6:30
Trituration Information	See link: (PDF)	See link: Trituration Information (PDF)	Not available online
DECS Rating	Not Evaluated	Not Evaluated	Not Evaluated

*Manufacturers provided the data in the tables.

Synopsis of Dental Amalgam Alloys* (6/06)

Product	**Valiant** 	**Valiant PhD** 	**Valiant Snap-Set** 
Manufacturer	Ivoclar Vivadent 175 Pineview Dr Amherst, NY 14228 (800) 533-6825 (716) 691-0010 (716) 691-2285 FAX www.ivoclarvivadent.us.com	Ivoclar Vivadent 175 Pineview Dr Amherst, NY 14228 (800) 533-6825 (716) 691-0010 (716) 691-2285 FAX www.ivoclarvivadent.us.com	Ivoclar Vivadent 175 Pineview Dr Amherst, NY 14228 (800) 533-6825 (716) 691-0010 (716) 691-2285 FAX www.ivoclarvivadent.us.com
Particle Type	Spherical	Admixture	Spherical
Composition (%)	Silver 49.5, Tin 30, Copper 20, Pd 0.5, Mercury:alloy ratio 43:57	Silver 52.5, Tin 29.7, Copper 17.5, Pd 0.3, Mercury:alloy ratio 47.25:52.75	Silver 49, Tin 29, Copper 21, Pd 0.5, Mercury:alloy ratio 43:57
Compressive Strength (PSI) 1 hr 24 hr	43,000 75,300	41,900 76,900	43,800 67,300
Packaging	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill
$/Capsule (2-sp, Reg Set) Retail: Government:	0.93 0.41	1.16 0.41	1.16 0.41
Working Time (mins)	3:30	3:30	2:30
Setting Time (mins)	6:30	6:30	5:30
Trituration Information	See link: (PDF)	See link: Trituration Information (PDF)	See link: Trituration Information (PDF)
DECS Rating	Not Evaluated	Not Evaluated	Not Evaluated

*Manufacturers provided the data in the tables.

Synopsis of Dental Amalgam Alloys* (6/06)

Product	**Contour** 	**Sybraloy** 	**Tytin** 	**Tytin FC** 
Manufacturer	Kerr Corp. 1717 W. Collins Ave Orange, CA 92867 (800) 537-7123 (714) 516-7400 (714) 516-7633 FAX www.kerrdental.com	Kerr Corp. 1717 W. Collins Ave Orange, CA 92867 (800) 537-7123 (714) 516-7400 (714) 516-7633 FAX www.kerrdental.com	Kerr Corp. 1717 W. Collins Ave Orange, CA 92867 (800) 537-7123 (714) 516-7400 (714) 516-7633 FAX www.kerrdental.com	Kerr Corp. 1717 W. Collins Ave Orange, CA 92867 (800) 537-7123 (714) 516-7400 (714) 516-7633 FAX www.kerrdental.com
Particle Type	Admixture	Spherical	Spherical	Modified Spherical
Composition (%)	Silver 41, Tin 31, Copper 28, Mercury:alloy ratio 47:53	Silver 41, Tin 31, Copper 28, Mercury:alloy ratio 44.5:55.5	Silver 59, Tin 28, Copper 13, Mercury:alloy ratio 42.5:57.5	Silver 61, Tin 26, Copper 13, Mercury:alloy ratio 44.5:55.5
Compressive Strength (PSI) 1 hr 24 hr	16,679 77,305	36,404 70,778	35,244 88,183	24,366 67,732
Packaging	Self-activating capsules 1, 2, 3 spill in both regular and fast set	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill
$/Capsule (2-sp, Reg Set) Retail: Government:	1.03 0.58	1.13 0.63	1.32 0.74	1.29 0.73
Working Time (mins)	Reg Set - 2:15; Fast Set - 2:00	Reg Set - 2:15; Fast Set - 2:00	Slow Set - 2:15; Reg Set - 2:00	Reg Set - 2:30; Fast Set - 2:00
Setting Time (mins)	Reg Set - 9:45; Fast Set - 7:45	Reg Set - 9:45; Fast Set - 7:45	Slow Set - 6:00; Reg Set - 4:15	Reg Set - 7:45; Fast Set - 5:30
Trituration Information	See link: (PDF)	See link: Trituration Information (PDF)	See link: Trituration Information (PDF)	See link: Trituration Information (PDF)
DECS Rating	Not Evaluated	Not Evaluated	Not Evaluated	Acceptable

*Manufacturers provided the data in the tables.

Synopsis of Dental Amalgam Alloys* (6/06)

Product	**GS-80** 	**Lojic+** 	**Permite** 
Manufacturer	SDI 729 N Rte 83 Ste 315 Bensenville, IL 60106 (800) 228-5166 (630) 238-8300 (630) 238-9200 FAX www.sdi.com.au	SDI 729 N Rte 83 Ste 315 Bensenville, IL 60106 (800) 228-5166 (630) 238-8300 (630) 238-9200 FAX www.sdi.com.au	SDI 729 N Rte 83 Ste 315 Bensenville, IL 60106 (800) 228-5166 (630) 238-8300 (630) 238-9200 FAX www.sdi.com.au
Particle Type	Admixture	Spherical	Admixture
Composition (%)	Silver 40, Tin 31.3, Copper 28.7, Mercury:alloy ratio 47.9:52.1	Silver 60.1, Tin 28.5, Copper 11.8, Pt 0.05, Mercury:alloy ratio 42.2:57.8	Silver 56, Tin 27.9, Copper 15.4, In 0.5, Zn 0.2, Mercury:alloy ratio 47.9:52.1
Compressive Strength (PSI) 1 hr 24 hr	32,625 63,800	39,150 75,400	37,700 72,500
Packaging	Hand-activated capsules 1, 2, 3, 5 spill in slow, regular and fast set	Hand-activated capsules 1, 2, 3 spill in slow, regular and fast set	Hand-activated and direct-placement capsules (direct injection without carrier) 1, 2, 3, 5 spill in 5 setting rates (slow, regular, fast, and extra carving time and slow carving time)
$/Capsule (2-sp, Reg Set) Retail: Government:	0.70 0.41	0.90 0.53	0.90 0.53
Working Time (mins)	Slow Set - 5:30; Reg Set - 4:30; Fast Set - 3:30	Slow Set - 4:00; Reg Set - 3:00; Fast Set - 2:30	Slow Carving - 6:00; Extended Carving - 5:00; Slow Set - 4:30; Reg Set - 3:30; Fast Set - 2:30
Setting Time (mins)	Slow Set - 14:00; Reg Set - 10:00; Fast Set - 9:00	Slow Set - 10:00; Reg Set - 9:00; Fast Set - 7:00	Slow Carving - 15:00; Extended Carving - 12:00; Slow Set - 10:00; Reg Set - 9:00; Fast Set - 8:00
Trituration Information	Not available online	Not available online	Not available online
DECS Rating	Acceptable	Acceptable	Not Evaluated

*Manufacturers provided the data in the tables.

Synopsis of Dental Amalgam Alloys* (6/06)

Product	**Zenith Premium Dispersed** 	**Zenith Royale High Copper** 	**Zenith Type-T Spherical** 
Manufacturer	Zenith/DMG Foremost Dental LLC 242 South Dean St Englewood, NJ 07631 (800) 662-6383 (201) 894-5500 (201) 894-0213 FAX www.zenithdmg.com	Zenith/DMG Foremost Dental LLC 242 South Dean St Englewood, NJ 07631 (800) 662-6383 (201) 894-5500 (201) 894-0213 FAX www.zenithdmg.com	Zenith/DMG Foremost Dental LLC 242 South Dean St Englewood, NJ 07631 (800) 662-6383 (201) 894-5500 (201) 894-0213 FAX www.zenithdmg.com
Particle Type	Admixture	Admixture	Spherical
Composition (%)	Silver 58, Tin 27, Copper 15 Mercury:alloy ratio 50:50	Silver 41, Tin 32.5, Copper 26.5 Mercury:alloy ratio 50:50	Silver 60, Tin 27, Copper 13 Mercury:alloy ratio 43:57
Compressive Strength (PSI) 1 hr 24 hr	23,000 58,000	30,000 65,000	28,000 68,000
Packaging	Self-activating capsules 1, 2, 3 spill in both regular and fast set	Self-activating capsules 1, 2, 3 spill	Self-activating capsules 1, 2, 3 spill
$/Capsule (2-sp, Reg Set) Retail: Government:	1.24 0.59	1.13 0.54	1.24 0.59
Working Time (mins)	Not Available	Not Available	Not Available
Setting Time (mins)	Not Available	Not Available	Not Available
Trituration Information	Not available online	Not available online	Not available online
DECS Rating	Not Evaluated	Not Evaluated	Not Evaluated

*Manufacturers provided the data in the tables.

Determining Mixing Times for Amalgam (Originally published in May 1997)

Question: I just received a new triturator that has a set mixing speed. Unfortunately, because the triturator is new, neither the manufacturer of the triturator nor the manufacturer of the amalgam I like to use provides a recommended mixing time for this triturator. Is there a way of determining how long I should mix the amalgam without simply guessing?

Answer: Your problem is not an uncommon one. Quite a few new triturators have been introduced to the market in the last five years. Not uncommonly, the manufacturer will neglect to include, or choose not to include, recommended mixing times for amalgam alloys. Usually, the clinician and assistant are left to their own devices to determine the appropriate mixing times. It is important to mix amalgam for the appropriate amount of time because it can affect the alloy's working time (i.e., the amount of time available for condensing and carving the amalgam), especially if the amalgam is an admixed type such as Dispersalloy® (Dentsply/Caulk), Valiant Ph.D.® (Vivadent), or Original D® (Wykle Research). It is therefore important to have a method you can use to quickly and accurately determine the appropriate mixing time for your amalgam.

One way of doing this is to follow the steps listed below:

-Set the triturator's mixing time for 6 seconds shorter than you normally use, then:
-Make a mix and examine the amalgam for plasticity.
-If the amalgam is too dry and does not hold together, increase the mixing time by one-second increments, each time making a test mix and examining its plasticity.
-When the first acceptable plastic mix is produced, increase the setting by two seconds and use that as the appropriate mixing time for that particular amalgam.
-Further adjustments of the mixing time may be necessary, however this gives you one way of determining a mixing time using an organized approach.

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